DCATT-MECH-PLAN-005
HEXAPOD PROTOTYPE TEST PLAN

Purpose

There will be 7 primary mirror hexapod assemblies, and 1 secondary mirror hexapod assembly on DCATT. A prototype hexapod assembly provides an engineering testbed to verify form, fit, and function of this vital optomechanical system early in the project.

Goals

The goals of the Hexapod Prototype effort are as follows:

1. Practice assembling the hexapod and locate assembly problems that may need to be addressed.
2. Verify the general viability of the hexapod design on a "mechanical" scale.
3. Perform frequency response tests on a prototype hexapod to validate finite element models.
4. Determine hexapod local coordinate system and transfer to an alignment cube.
5. Calibrate the software model to the prototype, developing methods that will be used to calibrate the DCATT testbed hexapods.
6. If possible, test the resolution of the actuator motion.
7. Test repeatability of motion for a single hexapod.
8. Test commutative actuator motion. That is, see if the order in which the hexapod legs are actuated changes the final position of the hexapod.
9. Test position stability over time, with power on and with power off.
10. Test the errors introduced to calibrated software models by returning the actuators to their limit switches.
11. Examine the effects of turning the power off and on.
12. Compare the motions and calibrations of two hexapods.
13. Test collision avoidance software.

Testing Phases

Phase 1: One prototype assembled without a mirror or test segment. Pursue Goals 1-3

Phase 2: The Phase 1 hexapod supporting a dummy segment with optical test equipment. Pursue Goals 4-11.

Phase 3: A second prototype hexapod supporting a dummy segment with optical test equipment. Pursue Goals 1, 4, 5, and 12.

Phase 4: The Phase 1 and Phase 3 hexapods supporting collision test segments. Pursue Goal 13.

Images of the Prototype Hexapod